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SOLID STATE COMMUNICATIONS

EDITOR-IN-CHIEF, MANUEL CARDONA **ASSOCIATE EDITOR-IN-CHIEF, ARON PINCZUK**

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Instructions for Authors on the Preparation of Camera-Ready Manuscripts for *Solid State Communications*

1. The manuscript is to be typed in **single column**. It will be assembled into double column format by Pergamon and reproduced photographically.

2. Manuscripts should be typed **single-spaced** on standard size, good quality white paper, preferably using an electric typewriter with a **black** ribbon (blue does not reproduce) and a 12 point typeface. Examples of the pertinent parts of a camera-ready manuscript are shown on pages iii and iv at the back of each issue.

   Manuscripts need not be free from "clean corrections".

3. Only the **title**, **authors' names and addresses**, and **"long title"** (i.e. abstract) are to be typed on the first sheet, turned horizontally. The title, not to exceed **8 inches** (20 cm) in width, should be typed in **capitals**. Leave single space and type the authors' names and addresses on separate lines, capitalizing the first letter of all the main words. After a single line space, type in statement about date of receipt of manuscript by the particular editor (and date of receipt of revised copy if any) provided by editor on first page of their original manuscript. After a triple line space type the "long title", without a heading, to a width of **6 inches** (15 cm). (*Optional:* after a single line space type a second "long title" in the national language of the author, if other than English, again to a width of 6 inches.)

4. The text is to be typed on subsequent sheets, **single-spaced**, in a single column 4 inches (10 cm) wide, leaving 1 inch (2.5 cm) margins at top and bottom. Each new paragraph should start indented, and only single-spaced from the preceding paragraph. Where necessary, lines containing superscripts (or subscripts) can be separated by an extra half space from the preceding (or following) line. Pages should be numbered consecutively using a blue pencil, in margin at top of each sheet. Any symbols (e.g. Greek characters) which are not available on the typewriter can be handwritten clearly in black ink.

   Please note that there are 70 lines per column and therefore 140 lines per printed page. The references are also to be typed in a 4 inch (10 cm) column.

   To determine the number of 4 inch (10 cm) lines of typewritten manuscript that you are allotted based on a maximum of four printed pages, you need only estimate the number of lines needed for the title, authors, addresses, abstract and figures and subtract this number of lines from the number of lines $4 \times 140 = 560$ for four pages.

5. Main section headings and subheadings are optional. Main headings should be typed centred on the column, capitalizing the first letter of all main words. Subheadings should be typed in the same style, full left. Use arabic numbers for main section headings. Do not underline the headings and leave a single space between all headings and the paragraph that precedes and follows them.

   The acknowledgement statement should be separated by a single space from the text. The word "Acknowledgement" should be typed full left, followed by a dash and then by the acknowledgement statement itself.

6. **References and footnotes**, except those on the title page, are to be indicated in the text by superscript arabic numbers, in sequence. Footnotes on the title page, such as those indicating present address of authors or research support, should be indicated by superscript single and double asterisks, etc. The list of references, including footnotes, should be typed single-spaced, on separate sheets in a single column 4 inches (10 cm) wide. Type the footnotes of the title page as the first entries, and then type the sequence of references and footnotes given in the text. Please ensure that authors' names are typed upper and lower case with the initials first.

7. **Equations** should be typed as part of the text in one or more lines, keeping within the designated single column width of 4 inches (10 cm). Equations which can not be typed in single-column-width should be typed on a horizontal sheet, keeping within a double-column-width of 8 inches (20 cm), and their position in the text indicated, by use of a blue pencil, in the margin.

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9. **Figures** must be submitted on **separate sheets** in a form suitable for direct reproduction, as original drawings, half-tones or bromides. **Xerox copies are unacceptable.** Authors are requested to pay attention to the size of lettering which must be suitable for reduction of 25 to 50% and to the fact that simple figures will be reduced to a final width of 4 inches (10 cm) and that others will be reduced to a final width of 8 inches (20 cm). Write figure number and authors' names on back of figure using blue pencil. Their place in the text should be indicated in the margin using a blue pencil.

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12. If errors are found after camera-ready manuscript has been mailed to Pergamon in Oxford, corrections can be made providing a **complete new page** is sent to Mrs. Margaret Jakeman, Journals Production Division (Nuffield), Pergamon Press Ltd, Headington Hill Hall, Oxford OX3 0BW, England, **within 5 days**.

13. Finally, a **reprint order form** will be sent to authors shortly after receipt of manuscript at the publishers. Camera ready manuscripts which are complete and prepared in accordance with the instructions will be published within 7 – 8 weeks of receipt.

DETECTION BY LOW TEMPERATURE PHOTOLUMINESCENCE OF OXYGEN RECOILS IN "THROUGH-OXIDE" ARSENIC IMPLANTED SILICON

D.R. Myers and B.G. Streetman

Coordinated Science Laboratory and Department of Electrical Engineering, University of Illinois, Urbana, IL 61801, USA

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The technique of low-temperature photoluminescence is used to study the damage induced by arsenic implantations through SiO_2 layers. The presence of an oxygen dependent damage center in only the "through-oxide" implanted samples and in none of the samples implanted into bare surfaces is interpreted as indicating the presence of oxygen recoils from the oxide. It is also seen that the in-diffusion of oxygen during thermal growth of the SiO_2 is insufficient to produce detectable oxygen-dependent luminescence after irradiation.

Superionic conductors[1] which show phase changes are an intriguing group of materials to study because of the possible different origins of their transitions. For example, the following questions can be asked. Is the phase transition driven by a soft mode and does the new phase, just by chance, have the proper arrangement for fast ion conduction? Is the phase transition driven by the need for the crystal to conduct which causes a transition to a phase with useful paths for the ions to move? Is the phase change driven by a combination of these and other mechanisms, and thus some modes will soften as T approaches T_c?

One way to begin to answer some of these questions is to study the lattice vibrational spectra above and below T_c. We report such a study in $RbAg_4I_5$ using the Raman technique and compare these results to those found in AgI, where we had previously observed very large, abrupt, reversable changes in the Raman spectra at T_c.

$RbAg_4I_5$ has a first-order transition[2,3] at T = 121°K, where the d.c. conductivity increases by a factor 100, and a second-order phase transition at T = 208°K, where the conductivity is continuous but $d\sigma/dT$ has a discontinuity. At room temperature $RbAg_4I_5$ has a complicated cubic structure[4] with space group O^7-$P4_13$ (or its enantiomorphic space group O^6-$P4_33$). There are four formula units per cell but the material is highly disordered since the 16 Ag^+ ions are randomly distributed over 56 sites. This space group does not have a center of inversion as a symmetry operation, yet it is not piezoelectric so infrared active phonon modes should not be Raman active (the exclusion rule) unless the disorder breaks this selection rule. On the other hand if the low temperature structures have space groups that are subgroups of O^7-$P4_13$ then they will be piezoelectric and most likely have infrared modes that are also Raman active. In fact, using the electric field echo technique[5], we have determined that the crystal is piezoelectric below 121°K. We will return to this point in discussing the results.

The material used in this study was prepared by reacting the proper concentrations of purified AgI and RbI in a sealed silica tube. The reacted mass was then slowly lowered through a heated zone where the maximum temperature was 215°C. The resulting material contained several large crystals, with a lattice constant of

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